

WHAT IS CLAIMED IS:

1. A differential gear apparatus for vehicles comprising an internal gear, a sun gear disposed at the inner side of said internal gear with an axis thereof aligned with that of said internal gear, a carrier including a circular cylindrical supporting part inserted between said internal gear and said sun gear with an axis thereof aligned with the axes of said internal gear and said sun gear, said supporting part being formed with a receiving hole whose axially outer and inner sides are open, and a planetary gear rotatably received in said receiving hole of said carrier and meshed with said internal gear at said open part on the outer side of said receiving hole and meshed with said sun gear at the open part on the inner side of said receiving hole,

wherein one side part of an inner peripheral surface of said receiving hole in a peripheral direction of said supporting part is constituted of an arcuate face having a same radius of curvature as the radius of said planetary gear, the other side part is constituted of an arcuate face having a radius of curvature equal to or larger than the radius of said planetary gear, and when said planetary gear is contacted with said one side part or said other side part of the inner peripheral surface of said receiving hole, a gap is formed between said other side part of the inner peripheral surface of said receiving hole and the outer peripheral surface of said planetary gear.

2. A differential gear apparatus for vehicles according to claim 1, wherein said one side part and said other side part of said inner peripheral surface of said receiving hole are each constituted of an arcuate face having a same radius of curvature as the radius of said planetary gear.

3. A differential gear apparatus for vehicles according to claim 2, wherein centers of curvature of the respective arcuate faces constituting said one side part and said other side part of said inner peripheral surface of said receiving

hole are arranged spaced away from each other in the peripheral direction of said supporting part.

4. A differential gear apparatus for vehicles comprising an internal gear, a sun gear disposed at the inner side of said internal gear with an axis thereof aligned with that of said internal gear, a carrier including a circular cylindrical supporting part inserted between said internal gear and said sun gear with an axis thereof aligned with the axes of said internal gear and said sun gear, said supporting part being formed with a receiving hole whose axially outer and inner sides are open, and a planetary gear rotatably received in said receiving hole of said carrier and meshed with said internal gear at said open part on the outer side of said receiving hole and meshed with said sun gear at the open part on the inner side of said receiving hole,

wherein a part of said planetary gear meshed with said internal gear and said sun gear is formed in a complete gear tooth part and an end part of said planetary gear axially projecting from said internal gear and said sun gear is formed in an incomplete gear tooth part, and the width of a tooth crest of said incomplete gear tooth part in the peripheral direction of said planetary gear is set larger than the width of a tooth crest of said complete gear tooth part.

5. A differential gear apparatus for vehicles according to claim 4, wherein a part of said receiving hole receiving therein an end part of said planetary gear where said incomplete gear tooth part is formed is a circular hole, in section, continuously formed over the entire periphery.

6. A differential gear apparatus for vehicles comprising a housing, a sun gear rotatably disposed in said housing and having a helical tooth, and a planetary gear disposed in said housing in such a manner as to be able to

rotate about its own axis and meshed with said sun gear, said housing being provided with an abutment surface which is formed on an inner surface thereof and which is adapted to allow an end face of said planetary gear to abut therewith, said planetary gear being provided with a tapered face-like chamfering which is formed on the outer periphery side of an end face of said planetary gear and whose width in the radial direction of said planetary gear is equal to or more than the height of tooth of said planetary gear,

wherein an intersection part between an end face of said planetary gear and said chamfering is formed with a convexly curved surface part capable of smoothly contacting said end face of said planetary gear and said chamfering.

7. A differential gear apparatus for vehicles comprising an internal gear, a sun gear disposed at the inner side of said internal gear with an axis thereof aligned with that of said internal gear, a carrier including a circular cylindrical supporting part inserted between said internal gear and said sun gear with an axis thereof aligned with the axes of said internal gear and said sun gear, said supporting part being formed with a receiving hole whose axially outer and inner sides are open, and a planetary gear rotatably received in said receiving hole of said carrier and meshed with said internal gear at said open part on the outer side of said receiving hole and meshed with said sun gear at the open part on the inner side of said receiving hole,

wherein said internal gear is provided at an inner peripheral surface thereof with a first guide part annularly extending about the axis of said internal gear and capable of abutting with an outer peripheral surface of said planetary gear, and said sun gear is provided at an outer peripheral surface thereof opposing said first guide part with a second guide part annularly extending about the axis of said sun gear and capable of abutting with an outer peripheral surface of said planetary gear.

8. A differential gear apparatus for vehicles comprising an internal gear, a sun gear disposed at the inner side of said internal gear with an axis thereof aligned with that of said internal gear, a carrier including a circular cylindrical supporting part inserted between said internal gear and said sun gear with an axis thereof aligned with the axes of said internal gear and said sun gear, said supporting part being formed with a receiving hole whose axially outer and inner sides are open, and a planetary gear rotatably received in said receiving hole of said carrier and meshed with said internal gear at said open part on the outer side of said receiving hole and meshed with said sun gear at the open part on the inner side of said receiving hole,

wherein said internal gear is provided at an inner peripheral surface thereof with a first guide part annularly extending about the axis of said internal gear and capable of abutting with an outer peripheral surface of said planetary gear, a guide member is disposed at an inner side of said internal gear, said guide member is provided at an outer peripheral surface thereof opposing said first guide part with a third guide part annularly extending about the axis of said internal gear and capable of abutting with an outer peripheral surface of said planetary gear.

9. A differential gear apparatus for vehicles comprising an internal gear, a sun gear disposed at the inner side of said internal gear with an axis thereof aligned with that of said internal gear, a carrier including a circular cylindrical supporting part inserted between said internal gear and said sun gear with an axis thereof aligned with the axes of said internal gear and said sun gear, said supporting part being formed with a receiving hole whose axially outer and inner sides are open, and a planetary gear rotatably received in said receiving hole of said carrier and meshed with said internal

gear at said open part on the outer side of said receiving hole and meshed with said sun gear at the open part on the inner side of said receiving hole,

wherein said planetary gear is provided at an outer peripheral surface thereof with a guide shaft part capable of turnably abutting with an inner peripheral surface of said internal gear and an outer peripheral surface of said sun gear.

10. A differential gear apparatus for vehicles comprising an internal gear, a sun gear disposed at the inner side of said internal gear with an axis thereof aligned with that of said internal gear, a carrier including a circular cylindrical supporting part inserted between said internal gear and said sun gear with an axis thereof aligned with the axes of said internal gear and said sun gear, said supporting part being formed with a receiving hole whose axially outer and inner sides are open, and a planetary gear rotatably received in said receiving hole of said carrier and meshed with said internal gear at said open part on the outer side of said receiving hole and meshed with said sun gear at the open part on the inner side of said receiving hole,

wherein said internal gear is provided at an inner side thereof with a guide member having a circular guide part in section with an axis thereof aligned with the axis of said internal gear, and said planetary gear is provided at an outer peripheral surface thereof with an annular guide part capable of turnably abutting with an inner peripheral surface of said internal gear and an outer peripheral surface of said guide part.